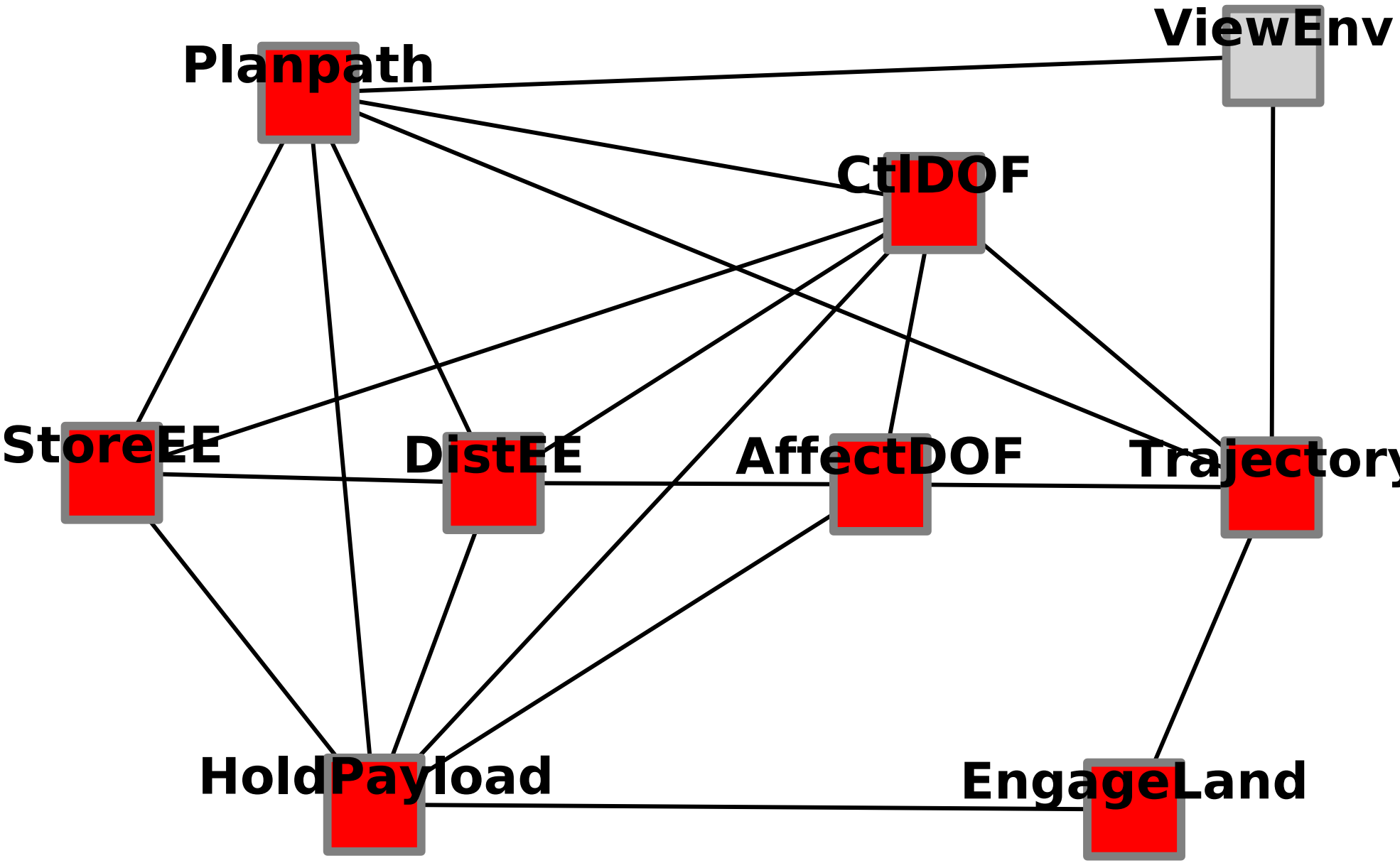bridging nodes